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(12) **United States Plant Patent**
Zimmermann

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(54) **HOP PLANT NAMED “YCR ACCESSION NO. 7”**

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(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) **Filed:** **Apr. 6, 1999**

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(52) **U.S. Cl.** **Plt./236**

(58) **Field of Search** Plt./236

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(57) **ABSTRACT**

The new hop plant variety is a bittering-type cultivar of recent origin. Its bittering and aromatic properties are similar to the Galena hop variety. However, unlike Galena which is susceptible to powdery mildew, the new variety is moderately tolerant to powdery mildew. It is also tolerant to Sphaerotheca. The new variety produces a medium size cone with fair to good pickability, and fair to good storageability. Harvest is medium-late, with a crop yield of 2450 to 2550 pounds per acre (2750 to 2860 kg/ha).

6 Drawing Sheets

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BACKGROUND AND SUMMARY OF INVENTION

This invention relates to a new and distinct variety of hop plant, and more particularly to a new hop plant variety of unknown parentage which was discovered among plants created as part of a controlled breeding program. The new variety has been stably reproduced over successive generations. Discovery of the new variety and initial reproduction by root cuttings was carried out in a research nursery in Prosser, Wash., U.S.A. Subsequent asexual reproduction took place in Granger, Wash., U.S.A.

THE DRAWINGS

- FIG. 1 shows a hop cone of the new hop plant variety;
- FIG. 2 shows a cluster of hop cones of the new hop variety;
- FIG. 3 shows a cluster of hop cones of the new hop variety;
- FIG. 4 shows a blossom and leaf of the new hop plant variety;
- FIG. 5 shows a bine of the new hop plant variety; and
- FIG. 6 shows a hop plant of the new variety.

DESCRIPTION OF THE VARIETY

The new hop plant variety is a bittering-type cultivar of recent origin. Its bittering and aromatic properties are similar to the Galena (unpatented) hop variety. However, unlike Galena which is susceptible to powdery mildew, the new variety is moderately tolerant to powdery mildew. It is also tolerant to Sphaerotheca. The new variety produces a medium size cone with fair to good pickability (similar to Galena), and fair to good storageability (25% to 30% alpha loss after six months common storage). Harvest is medium-late (approximately September 5 in Granger Wash.), with a crop yield of 2450 to 2550 pounds per acre (2750 to 2860 kg/ha).

The following is a detailed botanical description of the new and distinct variety of *Humulus lupulus*, based on observations of specimens grown in Grange, Wash. during

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the 1998 growing season. All colors are described according to The Royal Horticultural Society Colour Chart. It should be understood that the botanical and analytical chemical characteristics described will vary somewhat depending upon cultural practices and climatic conditions and can vary with location and season.

1. **Bine:**

Color.—Yellow green (146D).

Stripe.—None.

Stipule color.—Yellow green (146D).

Stipule direction.—Down, forked.

Diameter.—1.05 cm (measurement taken at 2.75 m).

Shoot emergence.—Medium early to medium; similar to Galena.

2. **Leaves:**

Leaf arrangement.—Opposite.

Leaf shape.—Cordate to palmate.

Average length.—18.8 cm.

Average width.—19.7 cm.

Color — upper surface, mature.—Green (139A).

Color — lower surface, mature.—Green (137B).

Color — upper surface, immature.—Green (139A).

Color — lower surface, immature.—Green (137B).

Number of leaf lobes.—1–5.

Margin.—Serrate.

Serrations per inch.—5 min., 8 max.

Pose.—Downward.

Average petiole length.—8.9 cm.

Venation.—Palmate.

Vein color.—Yellow green (146D).

3. **Cones:**

Average length.—3.3 cm.

Average diameter.—1.7 cm.

Color.—Bract tip: Yellow green (144A). Bract base:

Yellow green (145D). Bracteole: Yellow green (145C).

Shape.—Ovoid.

Bract shape.—Obovate.

Bract tip shape.—Mucronate.

Bract tip position.—Recurved.

Bracteole shape.—Oblanceolate.

Bracteole tip shape.—Narrowly rounded tip.

Shattering potential at harvest.—Similar to Galena.

% *Alpha acids.*—12.0%–14.0% of cone weight (ASBC Spectrophotometric method).

% *Beta acids.*—8.0%–9.0% of cone weight (ASBC Spectrophotometric method).

% *Cohumulone.*—32%–35% of alpha acids.

Total oils.—1.5–1.8 mL/100 g.

Aroma.—Mild, floral with spicy notes.

4. Technical data: Essential Oil Profile of YCR Accession No. 7: 103 mg of 10% Adsorbate/150C/5 Min. by DTD-GC-MS.

MS Spec#	Area Integration Peak Assignment	Area %
76–212	18520 acetone + isoprene	0.297
235–256	8148 2-methyl-3-buten-1-ol	0.131
274	412 pentanal ?	0.007
280	1051 hexene	0.017
287	412 ?	0.007
297	189 ?	0.003
302	145 ?	0.002
317	128 ?	0.002
350	2519 acetic acid	0.040
364	105 methylpentanone	0.002
371	1887 ? m/z 56, 70 peaks	0.030
387	166 ?	0.003
404	615 3-methyl-2-butenal	0.010
415	466 hexanal	0.007
426	3539 isobutyric acid	0.057
432	3119 n-octane	0.050
460	284 ?	0.005
473	229 isopropylisobutyrate	0.004
482	7032 3-methylbutyric acid	0.112
491	4103 2-methylbutyric acid	0.066
505	221 ? m/z 82/81/67 peaks	0.004
508	877 ? m/z 81 peak	0.014
521	14624 propanoic acid + propylisobutyrate	0.234
528	1939 2,6-dimethyl-2,4-heptadiene	0.031
537	2721 5,5-dimethyl-2(SH)-furanone	0.044
546	1776 alpha-pinene	0.028
554	587 isobutylisobutyrate	0.009
557	704 4-methylpentanoic acid	0.011
562	842 dimethyltrisulfide	0.013
569	30632 2-methylbutylpropanoate	0.491
578	600 6-methyl-5-heptene-2-one	0.010
582	43591 beta-pinene + methyl-5-methylhexanoate	0.698
595	1589016 myrcene	25.451
600	2746 isobutyl-2-methylbutyrate	0.044
607	38160 3-methylbutylisobutyrate	0.611
611	102594 2-methylbutylisobutyrate	1.643
615	18027 methylheptanoate	0.289
621	1084 ? sulfur-compd. possibly S-methylmethanethiosulphonate	0.017
629	12559 limonene + beta-phellandrene	0.201
634	2067 ? terpene	0.033
645	86156 beta-ocimene + pentyl-2-methylpropanoate	1.380
654	400 methyl-2,5-dimethylhexanoate	0.006
656	665 gamma-terpinene	0.011
662	450 isoctanol	0.007
672	6486 heptanoic acid	0.104
676	51375 methyl-6-methylheptanoate	0.823
682	1875 linalool oxide	0.030
686	650 terpinolene	0.010
691	24253 linalool + nonanal	0.388
697	16354 2-methylbutyl-2-methylbutyrate	0.262
700	10821 pentyl-3-methylbutyrate	0.173
704	661 ? sulfur-compd.	0.011
713	51579 methylactanoate	0.826
718	888 ? sulfur-compd.	0.014
725	1636 2,3-dihydro-3,5-dihydroxy-6-methyl-4(H)-pyran-4-one	0.026

—continued

MS Spec#	Area Integration Peak Assignment	Area %
734	11124 octanoic acid (branched isomer)	0.178
740	12989 hexylisobutyrate	0.208
743	450 cis-3-hexenylisobutyrate	0.007
745	1999 2-decanone (branched isomer)	0.032
752	458 heptanethioic acid, S-methyl ester	0.007
758	439 methylphenylacetate	0.007
771	22724 ? m.w. branched alcohol m/z 59 base peak + octanoic acid	0.364
779	262 4,8-dimethylnona-1,7-diene	0.004
783	16073 methylnonanoate (branched isomer)	0.257
789	11463 methylnonanoate (branched isomer)	0.184
795	165 ?	0.003
801	1728 heptylpropanoate	0.028
807	4605 methylnonenoate	0.074
818	541 ? 164 m.w. w/149 base peak (phenolic ?)	0.009
824	26497 methylnonanoate	0.424
831	83 nerol	0.001
841	1433 nonanoic acid (branched isomer)	0.023
848	347 ?	0.006
853	4011 2-methylheptylpropanoate	0.064
858	4500 geraniol	0.072
861	12462 2-undecanone (branched isomer)	0.200
870	211 methyl, 2-methylnonenoate	0.003
873	222 2-undecanol	0.004
882	11051 undecenyl alcohol + nonanoic acid	0.177
895	474 octenyl acetate	0.008
902	49630 methyldecanoate (branched isomer)	0.795
905	29807 2-undecanone	0.477
910	511 ? 180 m.w., 95 base peak, possibly bornylformate	0.008
921	2556 octylpropanoate	0.041
926	267900 methyl-4-decenoate + methyl-4,8-decadienoate	4.291
937	4377 methyldecanoate isomer + tridecane	0.070
940	4657 methylgeranate	0.075
947	91720 methyldecanoate	1.469
959	2258 decanoic acid (branched isomer)	0.036
976	7728 octyl-2-methylpropanoate	0.124
981	578 ? unsaturated alcohol or aldehyde	0.009
987	6658 2-dodecanone (branched isomer)	0.107
993	15287 methyl-2-undecenoate	0.245
999	3411 alpha-cubebene	0.055
1007	8331 decanoic acid	0.133
1014	15024 geranyl acetate	0.241
1020	307 ? acetate	0.005
1024	769 possibly bornylacetate	0.012
1029	40607 methylundecanoate (branched isomer)	0.650
1034	15141 alpha-ylangene + 2-dodecanone	0.243
1038	2758 2-methydecanoic acid	0.044
1048	2282 alpha-copaene	0.037
1055	2036 methylundecadienoate	0.033
1064	3883 methyl-10-undecenoate	0.062
1071	665 ? sesquiterpene 206 m.w. 163 base peak	0.011
1076	3061 methylundecanoate	0.049
1091	755736 caryophyllene	12.104
1100	18236 beta-cubebene	0.292
1106	718 linalylisobutyrate	0.011
1111	1009 3-methylbutylactanoate	0.016
1120	4584 2-tridecanone (branched isomer)	0.073
1135	1466661 humulene	23.491
1140	2713 ? 204 m.w. sesquiterpene 161 base peak	0.043
1145	1812 methylundecenoate	0.029
1156	48981 gamma-murolene + methylundecanoate	0.785
1165	4436 2-tridecanone	0.071
1170	739846 beta-selinene	11.850
1177	19970 methyl-3,6-decadienoate	0.320
1183	64588 alpha-selinene	1.034
1186	28882 geranyl isobutyrate	0.463
1192	4917 methylundecenoate + delta-cadinene	0.079
1202	32080 alpha-murolene	0.514
1206	2266 calamenene	0.036
1213	54844 beta-cadinene	0.878
1225	4495 delta-selinene	0.072

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MS Spec#	Area Integration	Peak Assignment	Area %
1232	10491	sesquiterpene w/no common name CAS#16728-99-7, cadinene-type	0.168
1242	4032	selina-3,7-diene (eudesma-3,7-diene)	0.065
1250	201	2-tetradecanone (branched isomer)	0.003
1258	6066	elixene	0.097
1264	284	?	0.005
1268	139	caryophyllyl alcohol	0.002
1282	10530	caryophyllene oxide	0.169
1293	300	methyltridecadienoate	0.005
1299	1823	humulene epoxide	0.029
1304	307	methyridecenoate	0.005
1313	18259	humulene epoxide	0.292
1319	1141	globulol	0.018
1324	1521	? 222 m.w. sesquiterpene	0.024
1339	6389	delta-cadinol	0.102

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-continued

MS Spec#	Area Integration	Peak Assignment	Area %
1351	8125	cadinol	0.130
1363	1200	eudesmol	0.019
1366	12410	Juniper Camphor (eudesma-7-en-4-ol)	0.199
1387	378	geranyl ester ?	0.006
1391	145	?	0.002
1439	198	?	0.003
1520	1897	? 250 m.w. w/115 base peak	0.030
6243539 Total Essential Oil Components			100.000

I claim:
1. A new variety of hop plant substantially as herein shown and described.

* * * * *



FIG. 1



FIG. 2



FIG. 3



FIG. 4



FIG. 5



FIG. 6

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : PP 12,401 P2
DATED : February 12, 2002
INVENTOR(S) : Charles E. Zimmermann

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page.

Item [73], Assignee, replace "Sunnyvale, CA" with -- Sunnyside, WA --.

Signed and Sealed this

Seventeenth Day of September, 2002

Attest:

A handwritten signature in black ink, appearing to read "James E. Rogan", written over a horizontal line.

Attesting Officer

JAMES E. ROGAN
Director of the United States Patent and Trademark Office